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**U.S. EPA Environmental Technology Verification (ETV) Program  
Advanced Monitoring Systems (AMS) Center**

**Air Stakeholder Committee Teleconference**

**Thursday, December 6, 2007**

**1:00 pm – 3:00 pm Eastern**

**Teleconference Meeting Minutes**

**AGENDA**

Welcome, Agenda, and Meeting Objectives

Rachel Sell,  
Battelle

ETV Program and AMS Center Updates

Amy Dindal, Battelle  
Teresa Harten, EPA

Verification of Leak Detection and Repair (LDAR) Devices  
at Petroleum Refineries and Chemical Plants

David Williams, EPA

Update on Technology Categories

Tom Kelly, Battelle

- Chemiluminescent Ozone Monitors
- Personal Sampling Pumps
- Selected Ion Flow Tube Mass Spectrometers
- Fungal Contamination Field Monitors

New Technology Category – Odor Detection (electronic-nose) Technologies

- Odor Detection, Mitigation and Control Forum – Rudy Eden, South Coast AQMD
- Vendor/Collaborator interest – Tom Kelly

New Technology Category Recommendations - *What's on the Horizon?* Rachel Sell

Next Meeting and Action Items

Rachel Sell

Adjourn

## **ATTENDEES**

### **Stakeholder Committee Members:**

Jeff Cook, California Air Resources Board  
Chuck Dene, EPRI  
Rudy Eden, South Coast Air Quality Management District (AQMD)  
Philip Galvin, New York State Dept. of Environmental Conservation  
Will Ollison, American Petroleum Institute (API)  
Roy Owens, Owens Corning  
Stephen Priebe, Idaho National Laboratory (INL)

### **Guest Speaker:**

David Williams, EPA

### **ETV AMS Center Staff:**

Amy Dindal, Battelle  
Bob Fuerst, EPA  
Teresa Harten, EPA  
Tom Kelly, Battelle  
Rachel Sell, Battelle  
Abby Waits, EPA

## **Welcome, Agenda, and Meeting Objectives**

Rachel Sell, Battelle AMS Center Stakeholder Committee Coordinator, welcomed committee stakeholders and AMS Center staff, took roll call of those stakeholders participating in the teleconference, and proceeded with an overview of the agenda, noting the focus of the call would be on evolving technology categories, verification testing progress, and identifying priority technology categories for verification.

## **ETV Program and AMS Center Updates**

Amy Dindal, Battelle AMS Center program manager, provided an update on the ETV Program and AMS Center. Ms. Dindal provided a brief summary of the activities during the February 2007 stakeholder meeting since this was the first meeting of the group since that meeting. She described how 128 verification reports have been completed by the AMS Center to date with 4 technology verification tests in progress (chemiluminescent ozone monitor, leak detection and repair, ELISA test kits for endocrine disrupting compounds, and lead-based paint test kits) and numerous under development. Ms. Dindal emphasized that any new verification test must have funding support in order to proceed, so the stakeholders are critical to the sustainability of the AMS Center since they are the ones that identify pressing environmental monitoring needs and identify and/or provide testing collaborations. Battelle provided seven letters of support to vendors of small business, a required option in phase II Small Business Innovation Research (SBIR) proposals. A list of the AMS Center collaborators in FY07 were provided, including: US Coast Guard; US EPA National Risk Management Research Laboratory; EPA Region 3; American Petroleum Institute; City of Columbus; US EPA Office of Solid Waste and Emergency Response; and US EPA Office of Pollution Prevention and Toxics.

Ms. Teresa Harten, director of EPA's ETV program, provided an update on the ETV program. Ms. Harten noted that 399 verifications (188 in the monitoring area) and 90 protocols have been completed to date by the ETV program. Collaborations and vendor cost-sharing has generated 50% of the program funds each of the last three years. A new ETV web site was unveiled in October with a more user friendly look and feel. Case studies booklets document and project outcomes for 15 technology categories verified are one of the most popular visited areas of the ETV web site. Ms. Harten presented a bar chart showing ETV cost efficiency over the last nine years which demonstrated that the cost per verification or protocol had decreased ~20% in FY07. She also presented a bar chart on Program-wide ETV Timing which showed that verifications completed in FY07 were completed, on average, seven months faster than those completed in FY06. Vendors want verifications to take less time to keep up with innovation and their competitors (ideally 12 months or less). Ms. Harten stated that the program has a continued focus on sustainability and incorporating sustainability metrics into verification testing. Stakeholder and vendor ideas on sustainability metrics are what should be inserted in the protocols. Ms. Harten explained that there is a lot going on with international ETV events. The ETV program office and the AMS Center (Karen Riggs) participated in the third International ETV Forum in Paris in November. A common approach to verification is being actively sought by an international workgroup from the US, Canada, and European Union (EU). In addition, the AMS Center is actively pursuing co-verification testing with ETV Canada (soil rapid toxicity testing) and NOWATECH, a Danish group funded by the EU under the EU pilot ETV program (passive groundwater samplers).

#### **Verification of Leak Detection and Repair (LDAR) Devices at Petroleum Refineries and Chemical Plants**

Before the presentation, Ms. Dindal noted this technology category is part of the Environmental and Sustainable Technology Evaluations (ESTE), the EPA-directed portion of the ETV program. The test/QA plan was developed under ESTE, but vendor recruitment and testing will be conducted under the AMS Center. David Williams said the EPA is interested in the verification of portable optical and thermal imaging devices for leak detection at petroleum refineries and chemical plants and is supporting an ETV test in this area. Currently in the U.S. and in other industrialized countries, fugitive emission monitoring (FEM) and LDAR programs are based on EPA Method 21, which involves the use of a portable organic vapor analyzer to monitor for leaks at industrial component interfaces such as flanges, couplings, and valves. Monitoring is performed so that leaks can be identified and repaired. Mr. Williams said this is accomplished by comparing the organic vapor analyzer reading, or screening value, with the leak definition in the applicable regulation. Current FEM methods, such as organic vapor analyzers, bubblers, and ultrasonic leak detection equipment, have traditionally been used in accordance with Method 21. While thorough, this procedure is costly because it requires a large amount of operator effort. In addition, since most of the fugitive emissions come from a few large leaks, the practice of individually checking each potential source is inefficient. The actual number of components to be tested in a refinery or chemical plant can be quite large, making Method 21 monitoring both time intensive and expensive.

A class of technology generally referred to as optical imagers offers operators the ability to monitor components from a distance and instantaneously identify leaking components within the line of sight of the optical imager. The remote sensing and instantaneous detection capabilities of optical imaging technologies allow an operator to scan areas containing many potential leaks, thus eliminating the need to visit and individually measure all potential leak sites. Optical imaging technologies include thermal imagers, laser systems, multispectral and hyperspectral imagers, Fourier transform infrared (FTIR) spectroscopy, and visible- to near-infrared systems. These technologies (similar in appearance to a 1990s camcorder) provide a tool to more quickly identify high leaking components by allowing the user to see images of leaking gas. Mr. Williams said the new technologies offer many advantages such as identifying leaks immediately, allowing quicker repair, and facilitating efficient use of resources.

A stakeholder asked how these new technologies will be instituted at industrial facilities in lieu of technologies that have traditionally been used in accordance with Method 21. Mr. Williams responded that hopefully these optical imaging technologies will become an alternative work practice promulgation in the near future. Texas, California, and Louisiana have instituted their own state alternative work practice and are using cameras to a great extent.

Mr. Williams said the verification is expected to be in collaboration with industry; the Texas Chemical Council and American Chemistry Council are expected to provide funding and a site for the test. The technologies will be tested against a suite of vapors (about 12-14 compounds); the EPA wants a robust system that sees many compounds, not a single one. It is expected that testing will occur in both winter and summer following laboratory testing.

### **Update on Technology Categories**

Tom Kelly provided an update on four technology categories; the first one has recently completed verification, one is in the planning stages, while the last two technology categories are in the preliminary discussion stages. He reviewed slides from a PowerPoint presentation distributed to stakeholders before the teleconference. He said that if anyone had questions about the slides to follow up with him after the call or to follow up with the point of contact listed on page 2 of the presentation.

Dr. Kelly reviewed the **Chemiluminescent Ozone Monitors** verification recently completed. The AMS Center evaluated the performance of the JSC Optec Ltd. 3.02 P-A ozone analyzer, a continuous monitor for determining ozone in air. Newly available in the U.S., the 3.02 P-A detects ambient ozone by means of its chemical reaction with a solid-phase reactant of proprietary composition, resulting in light emission, with peak intensity near 560 nm wavelength. The objective of the verification test was to evaluate the ozone analyzer's performance for determining ozone in air in part by comparing it to the response of the ultraviolet (UV)-absorption Federal Equivalent Method (FEM) for ozone.

Dr. Kelly briefly described the performance parameters tested and noted that both 3.02 P-A units relied entirely on their internal automated calibration systems, as specified by the vendor. Testing was conducted in conjunction with an American Petroleum Institute (API)-funded evaluation of multiple ozone monitors. Dr. Kelly thanked stakeholders Will Ollison and

Rudy Eden for their reviews of the verification report. It is expected that the final verification report will be available in early 2008.

Dr. Kelly said that during the February 2007 stakeholder meeting, stakeholders had interest and provided concurrence in proceeding with the technology category of battery-powered **Personal Sampling Pumps**, with a focus on sustainability criteria. Dr. Kelly reviewed slides detailing several kinds of high, medium, and low flow personal sampling pumps such as the Leland Legacy, Omni, AirChek XR5000, and 222 Pocket Pump. Stakeholders indicated there may be others to add to the list. Dr. Kelly reviewed the performance and sustainability criteria to be tested. Mickey Leland National Urban Air Toxics Research Center (NUATRC) is expected to provide co-funding for the test which is planned to start in summer of 2008. Dr. Kelly asked if any stakeholders would be interested in participating in the test. Jeff Cook and Rudy Eden both volunteered.

Dr. Kelly provided an update on the **Selected Ion Flow Tube Mass Spectrometers (SIFT-MS)** technology, another technology category that received stakeholder concurrence during the February meeting. Syft Technologies of New Zealand is interested in verification of its SIFT-MS technology, the Voice100 SIFT-MS. Dr. Kelly said that Syft described the technology as utilizing precisely controlled chemical ionization reactions to detect and quantify trace amounts of volatile organic compounds (VOC). It is applicable to alkane, alkene, and aromatic hydrocarbons, and oxygen-, sulfur-, and halogen-containing organics, as well as ammonia, hydrogen cyanide, hydrogen sulfide, nitrogen dioxide, and phosphine. The instrument has a continuous operation with a one-minute measurement time. During the February meeting, stakeholders identified many potential application areas including VOC speciation, odor complaint resolution, emergency response, human exposure (breath analysis), wood treatment sites, and evaluation of oxygenates. Syft is currently working through improvements in the SIFT-MS to increase its sensitivity and decrease its cost and size. Syft remains interested in ETV verification, but cannot fully fund a test. Until collaborators and co-funding is found, no additional action is planned for this category.

Chuck Dene and Phil Galvin wanted to know what kind of funding would be necessary and what application would be a good first choice to test. Ideal applications to test first would be ones that are difficult to measure with other technologies such as the wood products industry, ethanol, and organic acids from confined animal feeding operations (CAFOs). Dr. Kelly responded that co-funding depends on the application. Ms. Sell said she would send stakeholders more information on the SIFT-MS.

Dr. Kelly reviewed the final technology category, **Fungal Contamination Field Monitors**. Mycometer, Inc. of Tampa, Florida approached the AMS Center with interest in verification of its fungal contamination technology. Their technology, the Mycometer®-test, is a versatile tool for investigating mold in buildings allowing analysis of air, surface, and bulk samples. The field portable system allows users to determine total fungal biomass on-site in less than one hour and has a detection limit reported in nanograms. Stakeholders would like more information about this technology. They had questions about the types of mold sampled (e.g., are some molds harmless and some not) as well as specificity issues since total fungal biomass sounds non-specific.



## **New Technology Category – Odor Detection (electronic-nose) Technologies**

Rudy Eden of the South Coast AQMD provided information about the Odor Detection, Mitigation and Control Technology Forum and Roundtable Discussion hosted by the South Coast AQMD on October 30, 2007. He said that odors are of interest to agencies such as the AQMD since the public is concerned about the impact of odiferous substances on health and overall quality of life. Furthermore, odor is important with respect to compliance activities. Mr. Eden summarized the expert panel presentations that focused on the science of odors, odiferous substance detection technologies, odors as nuisance complaints, the impact of odors on health, and odor control technology. A roundtable discussion and public question and answer session followed the presentations in the afternoon. Mr. Eden said that presentations from the forum are online, but stakeholders were asked to contact Mr. Eden if they would like a CD set.<sup>1</sup>

Dr. Kelly provided an update on a new technology category, **Odor Detection (electronic-nose) Technologies**. He said that ODOTTECH contacted the AMS Center regarding potential interest in ETV verification of its technology, the OdoWatch™ System. The OdoWatch™ System is a network of e-noses with a meteorological package that is controlled by proprietary software and characterizes odors at various facilities (e.g., CAFOs, water treatment plants, etc.). Each sensor consists of 16 semiconductor sensor for various gases (e.g., NH<sub>3</sub>, H<sub>2</sub>S). ODOTTECH wants the entire system to undergo verification testing, not just the sensors. Dr. Kelly described how one or more sensor modules could be tested in a laboratory and field setting.

In the U.S., there is a lot of concern for CAFO odors. Discussions are underway with the state of Missouri to potentially host a CAFO site. Other sources of potential collaborator support being considered include the U.S. Department of Agriculture (USDA) and the National Pork Board. ODOTTECH prefers a test site in Canada and has indicated they would be willing to contact potential clients to seek co-funding.

Rudy Eden asked about human exposure issues since some odor compounds are toxics. Mr. Eden said that 1-butanol is a standard odorant and with odor panels you have to start at below detectable quantities and work your way up gradually. Furthermore, getting a qualified panel is doable, but complicated (i.e., all sorts of factors have to be considered - no perfume, no spicy food, etc.)

In response to that question, Dr. Kelly said that the OdoWatch™ System is calibrated by comparison to a human odor panel, using whole air samples from the target facility, so perhaps human exposure considerations may not be an issue. The output is reported as odor intensity, not as a chemical measurement. Two systems are currently in place in the U.S. at water treatment facilities.

Finally, Dr. Kelly noted that a solicitation for other odor sensor vendors was released and vendors with commercially available odor sensors were identified including:

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<sup>1</sup> Odor Detection, Mitigation and Control Forum. October 30, 2007. Announcement and Webcast Information, Agenda & Slides, and Forum Summary. Available at: <http://www.aqmd.gov/tao/ConferencesWorkshops/techforum.htm>

Q+A Solutions (not interested), AIRSENSE, INTERSCAN, Calibrated Instruments Inc., and Scensive Technologies. All vendors offer portable instruments, not field systems.

### **New Technology Category Recommendations - What's on the Horizon?**

Ms. Sell said that it sounded like stakeholders had provided stakeholder concurrence on pursuing a verification test for personal sampling pumps and would like more information on SIFT-MS and the fungal contamination monitor.

Regarding the odor detection technologies, stakeholders had interest in and provided concurrence for this category. Phil Galvin said he saw applications for this technology in cities dealing with sewage odors. Chuck Dene was interested in this topic (primarily SO<sub>3</sub> and ammonia) and said he could check for more vendors. Dr. Kelly said he would contact the vendor to see what they'd envision for an ETV test.

Will Ollison mentioned a new technology by the company, Picarro. Based on Cavity Ring-Down Spectroscopy (CRDS), Picarro offers portable trace gas analyzers which have application in many industrial process applications. The analyzer offers ppb-level detection sensitivity. Potential markets include CAFOs, for their NH<sub>3</sub> and H<sub>2</sub>S instruments. Mr. Ollison also said they have a NO<sub>x</sub> monitor in development and are considering developing an ozone instrument. The analyzers measure ambient levels, not source levels. He offered to forward more information to Ms. Sell following the call.

### **Next Meeting and Action Items**

Ms. Sell thanked all of the stakeholders for attending the meeting and contributing so much to the ETV program. She said that she would be back in touch with everyone in 2008 with meeting minutes to review from today's call as well as plan for the next stakeholder teleconference. The call adjourned at 3:00 pm *Eastern*.